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The influence of entrepreneurs' social referents on start-up size

Victor Martin-Sanchez[1] · **Ignacio Contín-Pilart**[2] · **Martin Larraza-Kintana**[2]

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Abstract This paper uses social comparison theory to explore the effect that the average size of established businesses at the regional (provincial) level may have on start-up size. It is argued that established entrepreneurs at the regional level become referents of new entrepreneurs, influencing not only the decision to become entrepreneurs but also the characteristics of the new venture, such as its initial size. Specifically, the greater the average size of established businesses at the provincial level, the bigger the start-up size of new ventures. This paper further considers how this effect is moderated by two key individual level variables: knowing an entrepreneur personally (i.e., close social referent), and being the owner and manager of an existing business (i.e., past entrepreneurial and managerial experience). Predictions are tested using data that combine individual- and provincial-level information in Spain over the period 2008–2014. The results show the positive relationship of the average size of established businesses on new venture start-up size, and that this effect decreases when the entrepreneurs have previous entrepreneurial experience.

Keywords Start-up size · Referent choice selection · Multilevel analysis

All authors contributed equally to this study.

✉ Victor Martin-Sanchez
victor.martin@kcl.ac.uk

Ignacio Contín-Pilart
contin@unavarra.es

Martin Larraza-Kintana
martin.larraza@unavarra.es

[1] King's Business School, King's College London, Bush House, 30 Aldwych, London WC2B 4BG, UK

[2] Management Department, Universidad Pública de Navarra, Institute for Advanced Research in Business and Economics (INARBE), Campus Arrosadía, Edificio Madroños, 31006 Pamplona, Spain

Introduction

Despite the importance of the size of new ventures for employment figures at the regional and national levels (Dencker et al. 2009; Osterman et al. 2002), over the last few years, scholars paid little attention to the study of factors determining the start-up size of new ventures (Colombo et al. 2004). This relative lack of attention is even more salient if we take into consideration the fact that previous studies have reported the existence of a positive relationship between start-up size and key outcomes of new ventures, such as the survival of the firm (Colombo et al. 2004) or its subsequent growth (Capelleras et al. 2008). In contrast, prior research has mainly focused its attention on the study of the determinants of new firm formation rates (Bergmann and Sternberg 2007; Bosma et al. 2012; Capelleras et al. 2013; Sternberg 2009).

In the past, drivers of start-up size have been proposed both from an economics perspective, looking at measures such as financial capital and market structures (Colombo and Grilli 2005; Mata 1996), and from an entrepreneurial and managerial approach, considering aspects such as founders' human capital and gender roles (Colombo et al. 2004; Verheul and Thurik 2001). Adding a social network perspective may also be important. Using a wide variety of social network perspectives, the management literature has obtained important insights on outcomes such as leadership (Pastor et al. 2002), mobility (Seibert et al. 2001), employment (Fernandez et al. 2000), individual performance (Mehra et al. 2001; Sparrowe et al. 2001), individual creativity (Perry-Smith and Shalley 2003), team performance (Hansen 1999; Tsai 2001), occupational choice (Krumboltz et al. 1976), and entrepreneurship (Baron and Markman 2003; Bosma et al. 2012; Lindquist et al. 2015; Renzulli et al. 2000; Shane and Stuart 2002). We argue that important insights concerning the determinants of new venture start-up size can also be gained by looking at the social network structure around the founder. We focus specifically on social comparison. Social comparison is the process of thinking about information concerning one or more persons in relation to oneself (Sluss and Ashforth 2008; Wood 1996). Social comparisons lead to the existence of social referents, who are persons with outcomes and inputs similar to the person making the decision (Kulik and Ambrose 1992; Sluss and Ashforth 2008). Social comparison theories have noted that comparison with other individuals (i.e., social referents) have a significant influence on people's decision and behaviors. Hence, we should also expect effects on decisions made by entrepreneurs, such as the decision about the size of the new venture being influenced by comparisons with social referents. To our knowledge, no study has previously looked at this issue from a social comparison perspective.

Therefore, in this paper we contribute to the relatively thin research stream on the determinants of start-up size, bringing social comparison concepts to bear to look at the influence that established entrepreneurs in the province ("macro-referents") may have on start-up size. Several authors have shown the positive influence that role models at the regional level (stocks of entrepreneurs) have on the individual decision to become a nascent entrepreneur (Contín-Pilart and Larraza-Kintana 2015), or on rates of entrepreneurship at the regional level (Sternberg 2009). More precisely, we argue that established entrepreneurs in the province become referents of new entrepreneurs, influencing not only the decision to become entrepreneurs but also the characteristics of the new venture, such as its initial size. Specifically, the greater the average size of

the established businesses at the provincial level, the bigger the start-up size of new ventures. In doing so, we look at how a macro-level variable influences an individual-level decision, and thus help reduce the macro-micro divide in entrepreneurship research. Recent publications have emphasized the need to keep looking at the interaction between the individual and the environment (Autio and Acs 2010; Capelleras et al. 2016; Contín-Pilart and Larraza-Kintana 2015; Shaver 2012; Stuetzer et al. 2014). This paper is a further contribution in this direction. Furthermore, focusing on Spain, the paper responds to the need to introduce into the analysis of entrepreneurship issues related to the existence of regional differences at the country level (Amorós et al. 2013). Our view, however, does not deny the influence that other socio-economic factors at the provincial level may have on the start-up size of new ventures, such as market structures, population density, etc.

However, the population of entrepreneurs in each geographical location (e.g., province) is heterogeneous and so is the impact of regional-level characteristics on individual-level behavior (Contín-Pilart and Larraza-Kintana 2015). Consequently, the impact of these macro-level social referents on entrepreneurs will be contingent upon the characteristics of the individual entrepreneurs. In this regard, the referent choice selection framework suggests that individuals tend to identify and select similar others as referents, and that such selection is, in part, contingent upon physical proximity and similarities in personal attributes and roles (Adams 1963; Ho and Levesque 2005; Kulik and Ambrose 1992; Shah 1998). In keeping with this idea, we argue that the influence of provincial-level social referents or macro-referents (i.e., established entrepreneurs in the province) will weaken in the case that entrepreneurs personally know other entrepreneurs who then become their social referents (mirco-referents). Furthermore, we note that there might also be a proximal social referent effect that might come from the accumulation of knowledge and skills gained from having previously created other ventures and having managed other firms; this experiential knowledge, which may be considered an outcome of human capital investments (Unger et al. 2011), is another key entrepreneurial characteristic that will also weaken the influence of social referents. Entrepreneur's decisions and behaviors with prior owner-manager experience will be less influenced by already established entrepreneurs (social referents). The study of these moderation effects further contributes to enhancing our understanding of the interaction between the environment and the individual in the entrepreneurial process (Autio and Acs 2010; Capelleras et al. 2016; Stuetzer et al. 2014).

To test our hypotheses, we employ a sample of 2856 entrepreneurs in Spain. Specifically, our data set combines individual-level information obtained from the Global Entrepreneurship Monitor (GEM) project in Spain with provincial-level information gathered from the Spanish Statistics Institute (INE) for the years 2008–2014. Multilevel analysis is employed to test the hypotheses. The results confirm that the start-up size of entrepreneurs' new ventures is higher when the average size of established businesses in the province is also greater. Also, they indicate that this influence weakens when the entrepreneur has additional experience as an owner and manager of another exiting business.

The remainder of this paper is organized as follows. First, we develop and justify three testable hypotheses. Second, we describe the data, variables, and methods. Third, we present the results of our empirical analysis. To conclude, we discuss the implications of the findings.

Theory and hypothesis development

Within an organizational research context, social comparison theory has highlighted the importance of referents in helping individuals to evaluate their acts (Shah 1998; Sluss and Ashforth 2008). It is well known that personal factors will influence both the availability of information (i.e., close social referent) and their perceived relevance (i.e., regional social referents) (Kulik and Ambrose 1992). In addition, environmental characteristics, specifically those situational factors related to both the availability of information and referent relevance (Kulik and Ambrose 1992), may have a particular effect on referent selection. Likewise, environmental characteristics may have an effect on referent selection, which in turn, will also be influenced by situational factors from both perspectives: availability of information and referent relevance (Kulik and Ambrose 1992). Thus, in this paper we draw on an organizational network research framework, in particular on the social referent selection perspective (Shah 1998), to assess the main effect of regional social referents on the start-up size of entrepreneurs' new ventures, and to see how such influence is moderated by the presence of close social referents and by the entrepreneurs' prior owner-manager experience. In other words, we consider how knowing an entrepreneur personally and/or having experience as owner and manager of an existing firm moderate the influence that the average size of established businesses in the region exerts on the size of new ventures. Accordingly, the analysis is developed at two levels. First, we look at the main effect of the average size of established businesses on start-up size. Second, we evaluate the moderating influence of close social referents, as well as the entrepreneurs' prior experience, in the relationship between regional social referents and start-up size.

Entrepreneurial activity, regional social referents and start-up size

Economic and social-regional factors influence individuals' decisions in the start-up process (Gnyawali and Fogel 1994; Mueller et al. 2008; Shane 2003; Sternberg and Wennekers 2005). Specifically, the degree and intensity of entrepreneurial activity in a certain area is related to the conditions of the environment (Bosma et al. 2012). As such, the literature on entrepreneurial action has revealed that the stock of entrepreneurs (social references) is a key factor in explaining new firm formation rates at the regional level (Bergmann and Sternberg 2007; Contín-Pilart and Larraza-Kintana 2015; Sternberg 2009).

However, as we have already noted in the introduction to this paper, previous studies have not addressed how the characteristics of these regional social referents (i.e., stock of entrepreneurs), and more precisely the average size of their established businesses, affect the characteristics (e.g., size) of new start-ups. The study of the determinants of start-up size is relevant in light of evidence that suggests that the origin of a significant proportion of employment generation comes from newly founded firms (Dencker et al. 2009). Furthermore, there seems to be a positive relationship between start-up size and the survival of the firm (Colombo et al. 2004), consequent firm growth (Capelleras et al. 2008), and therefore employment creation in the region. Given this relevance, the entrepreneurship literature has already analyzed the impact of different factors, such as founder's human capital, gender, or market structure on start-up size (Colombo et al. 2004; Verheul and Thurik 2001). However, an analysis of the influence of social

references on start-up sizes at a regional level is lacking in the literature. This paper seeks to bring clarity concerning this influence.

In doing so, we draw, on the one hand, on social comparison theories (Sluss and Ashforth 2008; Wood 1996), which note that comparison with other individuals (i.e., social referents) has a significant influence on people's decisions and behaviors, and on the other hand, on the social referent selection perspective (Shah 1998), which suggests that individuals tend to identify and select similar other referents (Kulik and Ambrose 1992). This means that entrepreneurs will look at other entrepreneurs in the process of creating a new firm. We argue that entrepreneurs who are in the very early stages of their entrepreneurial venture will likely pay attention to their regional social referents' characteristics, in our case the average size of the established businesses in their province of residence. In short, we point out that, in addition to other socio-economic factors, the size of new firms at the provincial level will be influenced by the average size of the established businesses run by the regional social referents. Therefore, we formulate the following hypothesis:

Hypothesis 1: *The average size of established firms is positively related to the start-up size of new ventures at the provincial level.*

The moderating effect of proximal social referents

Entrepreneurial scholars have argued that the effect of social referents may vary depending on the proximity of the person or people taken as referent. Accordingly, two main mechanisms have emerged to understand how close social referents are selected: cohesion and structural equivalence (Ho 2005; Ho and Levesque 2005; Shah 1998). The former states that individuals are influenced by direct ties to those with whom they share more interpersonal connections (Shah 1998). In other words, people usually tend to identify themselves with others sharing their beliefs, values, and attitudes (Byrne 1971), such as parents or relatives (Bosma et al. 2012; Chlosta et al. 2012; Lindquist et al. 2015), and peers or colleagues (Nanda and Sørensen 2010; Wyrwich et al. 2015). On the other hand, structural equivalent research states that people are influenced by others occupying a similar position or role in a network (Kulik and Ambrose 1992; Shah 1998; Sluss and Ashforth 2008).

From a structural equivalence perspective, we expect—because of their proximity to the focal individual—that close social referents will reduce the impact that macro-level (i.e., regional) referents, as stated in hypothesis 1, may have on the start-up size of new ventures. In other words, when a person, in our case the entrepreneur, is exposed to the influence of different referents, he or she will primarily be influenced by those referents belonging to the close personal network, thereby reducing the influence of more distal potential referents. As individuals tend to select referents similar to them in terms of personal attributes and roles (Adams 1963; Ho and Levesque 2005; Kulik and Ambrose 1992; Shah 1998), entrepreneurs will take other entrepreneurs into consideration when they take decisions about their ventures (i.e., when they are acting as entrepreneurs). The referent selection framework points out that the selection of others as referents is, in part, contingent upon physical proximity (Kulik and Ambrose 1992). Hence, when the entrepreneur personally knows other entrepreneurs, these are likely to become the primary referents and to have a significant influence on entrepreneurial decisions (i.e., those related to the new venture). That is, these entrepreneurs personally known by the entrepreneur

will become entrepreneurial micro referents (as opposed to macro-level regional referents). For this reason, we argue that when these entrepreneurial micro referents exist, the regional referents (macro referents) will lose their importance in the decisions made by the entrepreneur. Thus, start-up size decisions will be less influenced by the average size of established firms in the region (macro referents) when the entrepreneur knows other entrepreneurs personally (i.e., micro-level referents exist). Formally stated:

Hypothesis 2a: *Knowing an entrepreneur personally will reduce the positive effect that the average size of established firms in the province has on the start-up size of new ventures.*

If the entrepreneur has previous experience as an entrepreneur, the influence of other entrepreneurs in the region on the decisions of the entrepreneur is also likely to decrease. If personally knowing other entrepreneurs increases the chances of choosing them as referents and not regional-level ones, having personal experience as entrepreneur will certainly influence the decisions related to the new venture, diminishing the potential effect that more distal referents (i.e., regional level) may have. As nothing is closer to a person than him/herself, we suggest that from an internal perspective there might also be a proximal social referent effect that might come from the founder's experience itself. This mechanism is also consistent with the idea that the accumulation of knowledge and skills gained from having previously created other ventures or having managed other firms, which may be considered an outcome of human capital investment, has an effect on decisions related to new ventures (Unger et al. 2011). Therefore, in line with the previous hypothesis, start-up size decisions will be less influenced by the average size of established firms in the region when the entrepreneur has prior experience as entrepreneur. We state this argument in the following hypothesis:

Hypothesis 2b: *A founder's previous experience as an entrepreneur reduces the positive effect that the average size of established firms in the province has on the start-up size of new ventures.*

Figure 1 captures the conceptual model implied by our hypotheses. First, we expect that there is a positive relationship between the average size of established firms in the region and the start-up size of new ventures. Second, we predict that proximal social referents (other entrepreneurs personally known to the entrepreneur and own

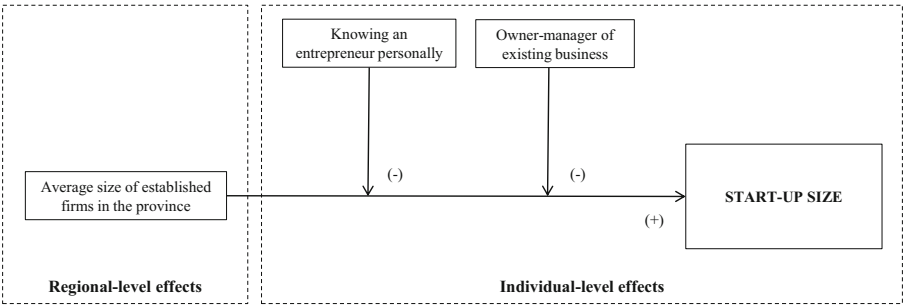

Fig. 1 Conceptual model and hypotheses

experience as an entrepreneur) will weaken the effect of the average size of established firms in the region on the start-up size of the entrepreneurs' new venture. The conceptual model proposed captures the two dimensions of the multilevel approach that we want to tackle in this paper: the regional context and the individual (Autio and Acs 2010; Autio and Wennberg 2010; Capelleras et al. 2016; Stuetzer et al. 2014).

Methods

Data collection and sample

To test our hypotheses, we use two levels of analysis (i.e., individual and regional). More specifically, our empirical model combines primary data on individuals and in Spain, and secondary data consisting of information at the provincial level. The analysis covers the years 2008 to 2014.

Individual observations are obtained from the Adult Population Survey (APS) in the Spanish Global Entrepreneurship Monitor (GEM) project. GEM is the largest annual international research initiative that collects and analyzes data on various forms of entrepreneurial activity, providing valuable insights into the state of entrepreneurship within and across different countries around the world (Reynolds et al. 2005). Therefore, we use the Spanish GEM data set because: (1) there is no better source in Spain for comparable data on entrepreneurship; (2) unlike other regional statistics, GEM captures all kinds of entrepreneurial activities; (3) GEM captures start-up efforts at an early stage, as well as established businesses. The APS is designed to obtain a representative sample of the Spanish population aged 18 to 64. From the original APS database, we selected those observations corresponding to individuals included in the Total Entrepreneurial Activity (TEA) index, i.e., those individuals (entrepreneurs) who are in the process of starting a business or running new businesses less than 42 months old (Reynolds et al. 2005). After cleaning missing values and non-valid answers, our pooled data set contains information on 2856 new ventures.

Regional variables were collected mainly from the Spanish Statistics Institute (*Instituto Nacional de Estadística*, INE) at the provincial level. The Spanish territory is divided into 52 provinces,[1] which are the second-level territorial and administrative divisions, and correspond to "NUTS 3" under the EUROSTAT classification. We have confidence that the variables gathered from INE adequately capture the regional characteristics referenced in our study.

Variable measurement

Dependent variable

In accordance with our conceptual model, the dependent variable is *start-up size*, which is measured by the natural logarithm of the new firm's total employees, exclusive of owners, at business inception.

[1] Because their high levels of population density, we omit 2 provinces corresponding to Ceuta and Melilla that are two independent cities geographically located in North Africa but that belong to the Kingdom of Spain. Their inclusion in the analyses does not affect our results and conclusions.

Regional-level predictor

The variable *average size of established firms* is our regional-level predictor. It is the average number of employees in established businesses in the province. This average is calculated using the GEM data set, which defines established businesses as those that have been in operation for more than 42 months. This variable is used to test hypothesis 1.

Cross-level interactions

To test hypotheses 2a and 2b, we created the following two cross-level interaction variables: *average size of established firms x knowing an entrepreneur personally* and *average size of established firms x owner-manager of existing business.* In these two cases, the average size of established businesses is mean-centered before the calculation of the interaction terms.

Individual-level controls

We control for the entrepreneur's *age* in years, also in a quadratic form (Autio and Acs 2010), and *gender* (1 = male, 0 = female). *Opportunity perception* is a measure of the entrepreneur's optimism (Cassar 2010). Specifically, it is a dummy variable set equal to 1 for entrepreneurs who perceive good opportunities to found a business within the next six months in the area where they live. We also control for *fear of failure*, a variable measuring whether fear would discourage an entrepreneur from starting up a business, as this variable can be an important constraint for entrepreneurial activity (Vaillant and Lafuente 2007). Another relevant control variable, particularly in the Spanish context, is *necessity entrepreneurship*, which takes the value 1 if the business was created by necessity or 0 if it was motivated by opportunity (Justo et al. 2015). Regarding the human capital variables, we capture *higher education* via a dummy variable set equal to 1 if the entrepreneur has post-secondary (university degree) education and 0 otherwise. *Entrepreneurship training* is measured by means of a dummy variable set equal to 1 if the entrepreneur has received some training activities related to starting an enterprise (and 0 otherwise). *Owner-manager of existing business* takes the value 1 only for entrepreneurs who own and manage an existing business. Finally, *knowing an entrepreneur personally* is a binary variable that takes the value 1 if the entrepreneur personally knew someone who had started a business within the previous two years.

Regional-level controls

As we have already noted in the introduction to this paper, it is necessary to control for the influence that other socio-economic factors at the regional level may have on start-up size. Thus, we control for the *share of the start-up rate*, which captures the ratio of new firm creation over the total working population. *Population density* is measured as the number of inhabitants per square kilometer (km^2) in each province, rounded to thousands for ease of presentation. The *annual unemployment rate change* is measured in terms of the change observed in the average unemployment rate from year $t - 1$ to year t. Provincial unemployment rates (in percentages) are published every three

months, so we compute the yearly average unemployment rate as the average of the reported rates for the four quarters. The *annual population change* is based on the number of inhabitants in each province in each year. As in the case of unemployment rates, the change is measured (in percentages) relative to the previous year's value. By calculating the relative change in these two variables, we account for the influence of the past on province-year individual current start-up size. In addition, the *GDP/c* denotes the gross domestic product per capita in each province and is given (for presentation purposes) in thousands of euros. We include time dummies to enable control for the *years* of the pool, excluding one year (2008) as a reference category. Industry controls are also included in all our specifications to account for sectorial differences on start-up size.

Table 1 summarizes the set of variables used in this paper.

Methodological approach

Our data set has a pooled cross-sectional time series structure, whereby individuals are hierarchically grouped by province. Because we use two levels of analysis, data are analyzed using hierarchical linear modeling methods (Autio and Wennberg 2010; Autio et al. 2013; Bosma and Sternberg 2014; Estrin and Mickiewicz 2011; Estrin et al. 2013; Stuetzer et al. 2014). We do not employ standard multivariate methods because they would preclude our assuming the independence of observations (Autio and Wennberg 2010; Hofmann et al. 2000). In other words, those methods would require us to view individuals as acting homogeneously but would not account for how the environment affects their decisions (Autio and Wennberg 2010).

To estimate the direct effect of the average size of established firms on the start-up size of new ventures, as well as the moderating effect of endowments of close social referents, we use a multilevel random effects specification (Autio et al. 2013; Estrin et al. 2013). Random effects analysis allows regression coefficients and intercepts to vary across provinces (Aguinis et al. 2011). In studies with more than one level of analysis, researchers have agreed that lower-level entities (e.g., individuals) are nested within higher-level ones (e.g., provinces) (Aguinis et al. 2013). This perspective has the advantage of facilitating multilevel analysis of cross-level interactions (Hundt and Sternberg 2014). In this regard, a multilevel random effects specification is more accurate than the multivariate methods (e.g., moderated multiple regressions) normally used in the management literature to estimate interaction effects (Aguinis et al. 2005).

We adopt a three-step strategy to test the direct effects of the average size of established businesses—and the moderating effect of close social referents—on start-up size. First, we devise a "null model" to estimate between-province variance in order to ensure that both the intercept and the slope vary across provinces. Our observation of significant provincial-level variance mandates the use of multilevel techniques (model 1 in Table 3). Next, we add individual- and provincial-level controls (model 2 in Table 3), and then the provincial-level predictor (model 3 in Table 3). Finally, we add cross-level interactions to estimate the moderating effects (models 4, 5, and 6 in Table 3). The model we use to estimate both the direct effect of the average size of established firms and the moderating effect of endowments of close social referents on the start-up size of new ventures takes the following form (Autio and Acs 2010; Autio et al. 2013; Snijders and Bosker 2004; Stuetzer et al. 2014).

Table 1 Description of variables

Variables	Description	Source
Dependent variable		
Start-up size	Natural logarithm of the new firm's total employees, exclusive of owners, at inception	GEM APS 2008–2014
Regional-level predictor		
Average size of established firms	Average number of employees of established businesses	GEM APS 2008–2014
Individual-level controls		
Age	Current age of participants in years	GEM APS 2008–2014
Gender	Dummy: 1 = male, 0 otherwise	GEM APS 2008–2014
Opportunity perception	Dummy: 1 = in the next six months there will be good opportunities for starting a business in the area where participants live, 0 otherwise	GEM APS 2008–2014
Fear of failure	Dummy: 1 = fear of failure would prevent participants from starting a business, 0 otherwise	GEM APS 2008–2014
Necessity entrepreneurship	Dummy: 1 = participants pursuing an opportunity, 0 = necessity	GEM APS 2008–2014
Higher education	Dummy: 1 = participants have post-secondary education, 0 otherwise	GEM APS 2008–2014
Entrepreneurship training	Dummy: 1 = participants had training courses in entrepreneurship, 0 otherwise.	GEM APS 2008–2014
Knowing an entrepreneur personally	Dummy: 1 = personally having known an entrepreneur in the last two years, 0 otherwise	GEM APS 2008–2014
Owner-manager of existing business	Dummy: 1 = current owner/manager of an existing business, 0 otherwise	GEM APS 2008–2014
Regional-level controls		
Share of start-up rate	Ratio of new firm creation (proportion of employers and self-employed individuals) over the total working population	INE 2008–2014
Population density	Number of inhabitants per square kilometer	INE 2008–2014
Annual unemployment rate change	Percentage of change in annual unemployment level	INE 2008–2014
Annual population change	Percentage of change in annual population level	INE 2008–2014
GDP/h	GDP per capita in euros	INE 2008–2014

GEM APS Global Entrepreneurship Monitor (GEM), Adult Population Survey (APS) http://www.gemconsortium.org/, *INE* Spanish Statistical Office *(Instituto Nacional de Estadísitica)* (INE) http://www.ine.es/en/

Individual-level component

$$\log\left(\pi_{ij}\right)_t = \beta_{0j} + \beta_{cj}\{individual\text{–}level\ controls_t\} + r_{ij}. \quad (1)$$

Regional-level component

$$\beta_{0j} = \gamma_{00} + \gamma_{01}\{regional\text{–}level\ predictor_t\} + \gamma_{02}\{regional\text{–}level\ controls_t\} + \mu_{0j}, \quad (2)$$

$$\beta_{cj} = \gamma_{p0} + \gamma_{p1}\{regional\text{–}level\ predictor_t\} + \gamma_{p2}\{regional\text{–}level\ controls_t\} + \mu_{pj}. \quad (3)$$

In this model, π_{ij} is a continuous measure of the start-up size of new ventures chosen by individual *i* in region *j*. As we use the logarithm to normalize this measure, β_{0j} is the coefficient for the effect of each individual—hierarchically nested in a specific province—on start-up size. β_{cj} are the coefficients for the individual-level variables. The term γ_{00} is the mean of all intercepts (sometimes called the "constant"; Autio and Wennberg 2010) across provinces, and γ_{p0} is the mean of all slopes across provinces. We use γ_{01} and γ_{02} to signify the coefficients for regional-level variables in model 3; similarly, γ_{p1} and γ_{p2} are coefficients for the cross-level variables in models 4, 5, and 6. Individual- and regional-level residuals capture the setup's random aspect; we use r_{ij} for the individual-level residuals, and μ_{0j} and μ_{pj} for regional-level ones. In other words, the variation in μ_{0j} and μ_{pj} quantify the degree of heterogeneity in intercepts across provinces, and the variation in r_{ij} quantifies the within-group variance (Aguinis et al. 2013). In sum, regional characteristics could affect individual-level regressions because of variation, at the individual level, in the intercepts and/or slopes across provinces.

In addition, we estimate the variance inflation factors for all our variables. The values range between 4.72 and 1.03, which indicates the absence of any serious multicollinearity problems. We follow the strictest standard, according to which values should be lower than 5 (Studenmund 1997). We note that the tolerance values are all above 0.1, which further indicates that our variables do not suffer from multicollinearity (Autio et al. 2013). Finally, skewness and kurtosis tests validate the univariate normality assumption.

Results

In this section, Table 2 provides descriptive statistics and correlations. Next, Table 3 presents the multilevel random intercept model results testing hypotheses 1, 2a, and 2b.

Table 2 Descriptive statistics and correlation matrix

	Mean	S.D.	1	2	3	4	5	6	7
1. Start-up size (Ln)	0.405	0.41	1.000						
2. Age	39.67	10.41	0.033**	1.000					
3. Gender	0.60	0.48	0.042**	0.012	1.000				
4. Opportunity perception	0.34	0.47	0.048**	−0.024**	0.037**	1.000			
5. Fear of failure	0.32	0.46	−0.051***	0.001	−0.073***	−0.121***	1.000		
6. Necessity entrepreneurship	0.23	0.42	−0.134***	0.039***	−0.064***	−0.093***	0.084***	1.000	
7. Higher education	0.45	0.49	−0.062***	−0.054***	−0.004	−0.016	−0.029**	0.041***	1.000
8. Entrepreneurship training	0.44	0.49	−0.010	−0.068***	0.008	0.026**	−0.039***	−0.016	0.187***
9. Knowing an entrepreneur personally	0.62	0.48	0.001	−0.070***	0.051***	0.132***	−0.065***	−0.044***	0.080***
10. Owner-manager of existing business	0.07	0.26	0.094***	0.111***	0.027**	0.038***	−0.050***	−0.062***	−0.142***
11 Share of start-up rate	0.01	0.002	−0.017	0.012	−0.006	0.031**	−0.032**	0.051***	0.206***
12. Population density (inhabitants/km^2 in thousands)	0.27	0.27	0.025*	0.002	0.040***	0.046***	−0.044***	−0.017	0.073***
13. Annual unemployment rate change (%)	22.00	0.38	0.076***	−0.018*	0.015	−0.009	0.012	−0.068***	−0.238***
14. Annual population change (%)	0.63	1.19	0.114***	−0.004	0.004	0.061***	0.000	−0.130***	−0.480***
15. GDP/h (€ in thousands)	23.08	4.93	0.033**	0.034**	0.005	0.066***	−0.034**	−0.073***	−0.048***
16. Average size of established firms	2.91	14.77	0.322***	0.033**	0.019	0.037**	−0.034**	−0.046**	−0.006

	8	9	10	11	12	13	14	15	16
1. Start-up size (Ln)									
2. Age									
3. Gender									
4. Opportunity perception									

Table 2 (continued)

	8	9	10	11	12	13	14	15	16
5. Fear of failure									
6. Necessity entrepreneurship									
7. Higher education									
8. Entrepreneurship training	1.000								
9. Knowing an entrepreneur personally	0.057***	1.000							
10. Owner-manager of existing business	−0.040***	0.048***	1.000						
11 Share of start-up rate	−0.015	0.043***	−0.028**	1.000					
12. Population density (inhabitants/km^2 in thousands)	0.051***	0.009	−0.031**	0.253***	1.000				
13. Annual unemployment rate change (%)	−0.002	−0.034**	0.047***	−0.092***	0.014	1.000			
14. Annual population change (%)	−0.101***	−0.047***	0.134***	−0.145***	0.040***	0.418***	1.000		
15. GDP/h (€ in thousands)	0.000	0.003	0.030**	−0.108***	0.436***	−0.080***	0.253***	1.000	
16. Average size of established firms	0.005	−0.001	0.112***	0.019	0.018	−0.001	0.012	0.020	1.000

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$

Table 3 Multilevel random intercept model predicting start-up size

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Individual-level controls						
Age		0.0011	0.0007	0.0007	0.0008	0.0008
		(0.0006)	(0.0006)	(0.0006)	(0.0006)	(0.0006)
Age squared		0.0001**	0.0000	0.0000	0.0000	0.0000
		(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Gender		0.0207	0.0180	0.0178	0.0216*	0.0213
		(0.0142)	(0.0131)	(0.0131)	(0.0130)	(0.0130)
Opportunity perception		0.0273*	0.0179	0.0176	0.0206	0.0200
		(0.0159)	(0.0153)	(0.0153)	(0.0152)	(0.0151)
Fear of failure		−0.0354**	−0.0263**	−0.0265**	−0.0254*	−0.0257*
		(0.0144)	(0.0134)	(0.0134)	(0.0132)	(0.0132)
Necessity entrepreneurship		−0.1182***	−0.0752***	−0.0751***	−0.0755***	−0.0752***
		(0.0161)	(0.0147)	(0.0147)	(0.0145)	(0.0145)
Higher education		−0.0019	0.0209	0.0207	0.0222	0.0219
		(0.0167)	(0.0148)	(0.0148)	(0.0146)	(0.0146)
Entrepreneurship training		0.0080	0.0125	0.0123	0.0134	0.0131
		(0.0144)	(0.0131)	(0.0131)	(0.0130)	(0.0130)
Knowing an entrepreneur personally		−0.0015	−0.0032	0.0010	−0.0028	0.0085
		(0.0146)	(0.0135)	(0.0152)	(0.0134)	(0.0151)
Owner-manager of existing business		0.1489***	0.2130***	0.2127***	0.1391***	0.1363***
		(0.0350)	(0.0317)	(0.0317)	(0.0327)	(0.0327)
Regional-level controls						
Share of start-up rate		−3.2945	0.1059	0.2137	0.2400	0.5305
		(4.2796)	(4.1434)	(4.1541)	(4.0726)	(4.0951)
Population density		0.0294	0.0363	0.0361	0.0362	0.0357
		(0.0420)	(0.0333)	(0.0334)	(0.0325)	(0.0328)
Annual unemployment rate change		0.0220	−0.0001	−0.0003	−0.0154	−0.0163
		(0.0219)	(0.0240)	(0.0240)	(0.0238)	(0.0238)
Annual population change		0.0123	−0.0085	−0.0085	−0.0077	−0.0078
		(0.0080)	(0.0079)	(0.0079)	(0.0077)	(0.0078)
GDP/h		0.0014	0.0002	0.0002	0.0000	0.0000
		(0.0022)	(0.0017)	(0.0017)	(0.0017)	(0.0017)
Regional-level predictor						
Average size of established firms (H1)			0.0373***	0.0366***	0.0393***	0.0373***
			(0.0011)	(0.0016)	(0.0011)	(0.0016)
Cross-level interaction						
Average size of established firms × knowing an entrepreneur personally (H2a)				0.0013		0.0036
				(0.0022)		(0.0022)
Average size of established firms × owner-manager of existing business (H2b)					−0.0436***	−0.0447***
					(0.0054)	(0.0054)
Random effects parameters						
Intercept	0.4041***	0.3239***	0.3731***	0.3701***	0.3744***	0.3663***
	(0.0084)	(0.0907)	(0.0830)	(0.0833)	(0.0816)	(0.0821)
Variance of random intercept	0.0012**	0.0011***	0.0003***	0.0003***	0.0003***	0.0003***

Table 3 (continued)

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	(0.0007)	(0.0007)	(0.0004)	(0.0004)	(0.0004)	(0.0004)
Variance of overall residual	0.1691	0.1607	0.1134	0.1134	0.1109	0.1108
	(0.0035)	(0.0038)	(0.0030)	(0.0030)	(0.0029)	(0.0029)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Years fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	4692	3449	2856	2856	2856	2856
No. of groups (provinces)	50	50	50	50	50	50
Wald chi square	-	175.63***	1308.06***	1308.51***	1402.66***	1406.30***
Log likelihood	−2500.8885	−1751.1108	−948.7352	−948.5491	−916.7739	−915.4543
Degrees of freedom	0	23	24	25	25	26
AIC [a]	5001.77	3548.2216	1945.47	1947.0982	1883.5478	1882.9086

Table reports non-standardized β coefficients. Robust standard errors are in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$; two-tailed significance.

[a] AIC (Akaike's Information Criterion) $=2k - 2$ x (log likelihood), where k indicates degrees of freedom.

The entrepreneur profile is described as follows. Table 1 shows that the average age of individuals in the sample is almost 40 years and that 60% of them are men. Most of the entrepreneurs (66%) do not see good opportunities in the next six months to set up a business in their area. Some 23% of the entrepreneurs in our sample admit that their entrepreneurial activity is driven by necessity. Regarding human capital, the table shows that 45% of entrepreneurs have higher education qualifications (university degree), nearly 44% are individuals who have received entrepreneurship training, and 7% are owners and managers of an existing business. Finally, regarding close social (micro) referents, 62% of respondents reported having known an entrepreneur personally in the previous two years.

Regarding the regional-level variables, the average population density is 276.51 inhabitants per square kilometer. The annual unemployment rate is shown to have increased 22.2% at the provincial level (on average). This shows how hard the economic crisis has hit the Spanish economy in the period covered in our analysis. The annual population change is around 0.63% inhabitants and the average GDP per capita among the provinces is around €23,082. The average share of start-up rate in the province is 1%. This denotes the proportion of new businesses birthed over the total working population. Finally, the average size of established firms is around 3 members (2.91).

As expected in our theoretical section, bivariate correlations show that the start-up size of new ventures is positively related to the average size of established firms in the province.

Table 3 provides the results of the multilevel random intercept model predicting the start-up size of new ventures. Model 2 provides the baseline results for the individual- and regional-level control variables. Model 3 incorporates the effect of the regional predictor and accordingly shows the influence of the average size of established businesses on start-up size. This variable is statistically significant. Consequently, hypothesis 1 is supported. Neither models 4 nor 6 support hypothesis 2a, according

to which the relationship between the average size of established firms and the start-up size of new ventures varies based on knowing an entrepreneur personally who started up a new business in the previous two years. Finally, model 5 provides support for hypotheses 2b. We find that the positive effect of the average size of established businesses on start-up size observed in model 3 varies with the entrepreneur's owner-manager experience; this result holds in the full model (model 6). An implication of these findings is that owner-manager experience gives the entrepreneur a more realistic view based on his/her experience in another existing firm, and therefore makes the founder more aware of the risks and uncertainties in the early stages of a new venture creation, which in turn affects how big the new venture will be (in terms of the number of employees at inception).

To gain a better understanding of the interaction effect, we next present the corresponding interaction plot. We use the estimated coefficients presented in Table 3 to create a graph. Following the standard procedure in this kind of graphic representation, the average start-up size of new ventures appears on the vertical axis, with the size of established businesses (small and large) on the horizontal axis. Accordingly, Fig. 2 represents the interaction effect—on the start-up size of new ventures—of the average size of established businesses and the owner-manager experience of the new venture's founder. Consistent with hypothesis 2b, we observe that the average size of firms in the province has a positive impact on the start-up size of those entrepreneurs without previous experience. The overall impact on the start-up size of those business initiatives launched by experienced entrepreneurs is almost negligible, and even slightly negative.

Several control variables are statistically significant. As such, owner-managers of existing firms on average tend to create larger new ventures, whereas necessity entrepreneurs and those who declare they have a "fear of failure" seem to launch relatively smaller new ventures.

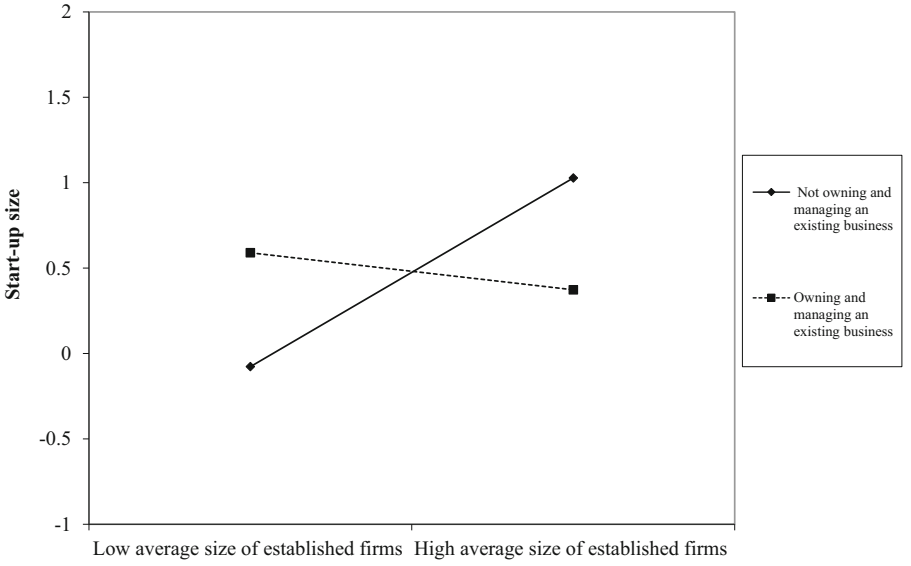

Fig. 2 Moderating effect of close social referent (experience) on the relationship between potential social referents and start-up size

Further analyses

Clearly start-up size is only observed for those individuals who have become entrepreneurs. However, there may be concerns that self-selection into entrepreneurship might have biased our findings. In this vein, we also consider the bias caused by potential interdependence between the choice of whether to become an entrepreneur and start-up size by introducing into the start-up size equation (second-stage or outcome equation) the inverse Mill's ratio (IMR), based on modeling the choice to become an entrepreneur (first-stage or selection equation). For identification purposes, we choose a variable that is correlated with the first-stage dependent variable (entrepreneurial entry) and uncorrelated with the second variable (start-up size). Specifically, we use a variable capturing the individual's family size. This is derived from GEM data capturing the number of family members in the entrepreneur's household. This variable is shown to have an influence on the entry decision to entrepreneurship (Blanchflower and Oswald 1998), but it is not relevant to the start-up size of new firms according to our results. Thus, we introduce "family size" into the selection equation. Overall, we do not detect a significant selection bias arising from the possibility that the factors determining the decision to become an entrepreneur might differ from those determining a new firm's start-up size. In other words, the outcome of our hypothesis testing with and without the inclusion of IMR is unchanged (Autio et al. 2013; Estrin et al. 2013). These extra results are not reported here, but all of them are available upon request.

In addition, the province-year individual start-up size may be affected by some macro variables, such as unemployment and the population rate. These two regional measures are closely related to the economic cycle and are likely to be influenced by the circumstantial effect of a given year. Consequently, we address this issue by calculating the change in the measure for the aforementioned two variables.

Discussion and conclusions

Entrepreneurship is a key driver of employment creation, regional development, and general well-being. While the start-up size of new ventures has a significant impact on employment figures at the regional and national level (Dencker et al. 2009), scholars have paid little attention to the study of factors determining the start-up size of new ventures. This study explores this issue from a perspective never previously considered in the study of the determinants of new venture start-up size: social comparison theory. In doing so, we bring the importance of social referents, and the social network structure around the founder in general, into this stream of research.

We have observed that the characteristics of the macro-level (i.e., provincial) social referents affect the characteristics of new ventures created by entrepreneurs. Specifically, we have reported that there is a connection between the average size of the firms already created by other entrepreneurs in the region in the past and the size of new start-up initiatives. This is an important result, not only because it provides evidence that the impact of regional social referents goes beyond the decision to become an entrepreneur, but also because it shows that new entrepreneurs tend to imitate the characteristics of already established businesses. New entrepreneurs may see in the features of existing

businesses some guidance concerning the characteristics of a successful business, and may try to imitate what they may understand are tried and proved ways of doing things. In this regard, this article is a first step in the direction of further understanding how the characteristics of existing businesses in a region influence the characteristics of new ones. Future research should go beyond the size dimension analyzed here, and should explore whether there is also a significant influence related to other dimensions of entrepreneurial activity, for example the selection of the industry, the international orientation of the firm, growth aspirations, or the implementation of specific management practices.

Our findings have clear connections with the literature on regional role models (Bosma et al. 2012), which has previously noted that the stock of entrepreneurs in each region may act as role models for new and prospective entrepreneurs, and therefore have a significant influence on the entrepreneurial activity of that concrete geographical location. However, importantly, we add to that line of thought the fact that influence goes beyond the decision to become or not to become an entrepreneur, and influences the characteristics of new entrepreneurial initiatives. This influence on the characteristics of new enterprises may lead us to consider the existence of a replication phenomenon, in which newcomers respond, to some extent, to what incumbents have done before. In this regard, social comparison theory may provide valuable hints concerning the micro-level mechanisms that explain mimicking patterns at the macro level.

Our theory and evidence also highlight the relevance of studying the regional context to gain a fuller understanding of entrepreneurship. In line with previous research (e.g., Amorós et al. 2013; Sternberg 2009; Stuetzer et al. 2014), our study also points to regional-level differences inside countries being important determinants of entrepreneurial activity. Practitioners and policymakers at the regional, national, and supranational levels should take into account the role played by the regional environment. This paper places emphasis on one particular element: the size of businesses already in the region where the entrepreneur resides. However, other elements, such as financial capital and the market structure (Colombo and Grilli 2005; Mata 1996), the presence of role models (Bosma et al. 2012), the economic context, and an entrepreneurial culture (Stuetzer et al. 2014), or even the distribution of personality traits (Obschonka et al. 2013) also matter. Lack of consideration of these regional-level idiosyncrasies may lead to inefficient or erroneous policies (McCann and Ortega-Argilés 2016). It is the role of academics to continue efforts to develop a better theoretical and empirical understanding of the impact of these regional differences on different facets of the entrepreneurial process, to provide much better guidance to policymakers and practitioners.

The confirmation of the connection between the size of macro-level referents and the size of new start-ups helps to close a little more the macro and micro divide in entrepreneurship research (Autio and Acs 2010; Contín-Pilart and Larraza-Kintana 2015; Shaver 2012). The article further contributes to bridging the micro and macro levels of analysis in entrepreneurship research by looking at the moderating role that proximal social referents may play in the aforementioned main relationship. Specifically, we have focused on the individual entrepreneur and have highlighted the moderating role of two individual-related variables: the existence of a personal relationship with other entrepreneurs and the entrepreneur's previous personal experience as an entrepreneur. We have argued that when there are other closer (i.e., micro-level)

relevant referents for the entrepreneurial activity, such as other entrepreneurs personally known to the entrepreneur or the entrepreneur's previous experience in that role, entrepreneurs may pay more attention to the micro-level referents and less to macro-level ones. In a sense, our arguments and results provide some hints and evidence for exploring the ways in which individuals vary their use of referent information according to their characteristics (Ho and Levesque 2005).

Specifically, and in line with our argument, we have observed that the impact the average size of the companies of regional-level social referents may have on the start-up size of new ventures weakens or even vanish when the entrepreneur has previously owned and managed another firm. However, we find no support for the prediction that entrepreneurs who personally know other entrepreneurs will be less influenced by the macro-level social referents. Indeed, knowing another entrepreneur does not seem to have any significant impact on new venture start-up size (recall that the main effect is non-significant). Apparently, such close entrepreneurs are not sufficiently influential to produce a significant impact on the reported influence of macro social referents. However, with the data at hand, we cannot completely reject the possibility that such influence on the size of new start-ups exists. As is clear in our analysis, we unfortunately lack access to information concerning the size of the firms created by those entrepreneurs known to the focal entrepreneur. Similarly, there is no access to data on the size of the firm or firms created by the entrepreneur in the past. It would certainly be interesting to have the possibility of exploring in the future the extent to which the characteristics of such "proximal" businesses are reflected in new ventures. Such research attempts will require a well-designed and resource-intensive data gathering process as it implies, first, the identification of those proximal social referents, and second, an assessment of the characteristics of the businesses (e.g., size, sector) run by those referents. Albeit somewhat speculative, one may argue that as most business in Spain are small firms or microfirms according to the official records of the INE, if a person/founder knows an entrepreneur or has owned and managed a firm before, it is most likely that the entrepreneur will be running a small firm or a microfirm. Hence, if we accept this assumption and that close social referents influence new entrepreneurs, these close social referents would favor the creation of firms that are small in terms of size. However, we cannot test this hypothesis with the data available.

Although this paper contributes several original ideas and evidence to the literature, it is not free of limitations. First, we would like to have more fine-grained information concerning referent selection. In particular, it would be very interesting to have more information on close social referents and to be able to determine, for example, if these close referents are peers (Nanda and Sørensen 2010; Stuart and Ding 2006), family or friends (Bosma et al. 2012; Lindquist et al. 2015), and so. Moreover, we use cross-sectional data, but perhaps a data set with longitudinal information about the individuals would provide a richer and more attuned analysis. Third, the use of dichotomous scales may be considered a limitation that we consider worth noting. The use of binary outcomes in a large international dataset such as GEM has been justified with the aim of reducing bias caused by cultural interpretations (Autio et al. 2013). Also, such measures reduce problems with translation equivalence (Ter Hofstede et al. 2002). Finally, the positive relationship between the size of existing firms and the initial size of new businesses may reflect the economic structure of the region. That is, it may be argued that more industrialized regions will tend to have bigger firms and will force

new firms to be born bigger to compete with existing firms. To control for this potential confounding effect, we have introduced in our models variables that intended to capture the economic structure of the region. While probably imperfect, we feel confident that we could reasonably approximate such structure.

In sum, this paper has shown that there is a connection between the characteristics of the businesses run by regional-level referents (established firms in the province) and the features of new ventures. Specifically, we have focused on a key firm-level characteristic: size. We believe that this line of inquiry should be further explored in future research. It would be advisable to keep working on the effect of the characteristics of social referents in relation to other aspects of new firms, such as industry selection, the degree of internationalization, and growth aspirations. A better understanding of the impact of social referents on these other facets of new firms may be of interest, not only for academics, but also for practitioners and policymakers.

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